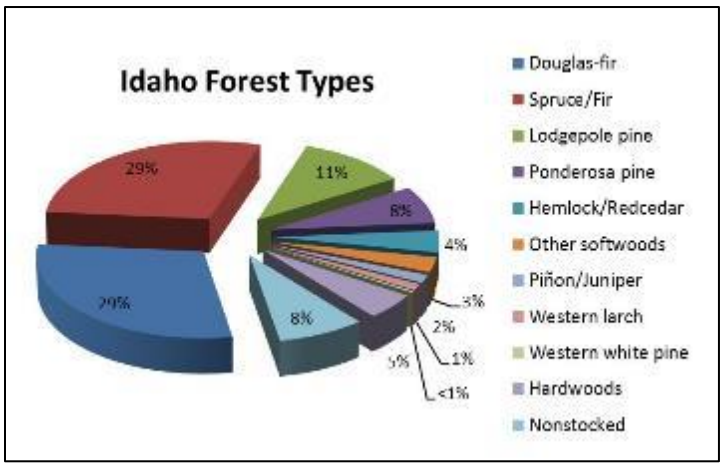
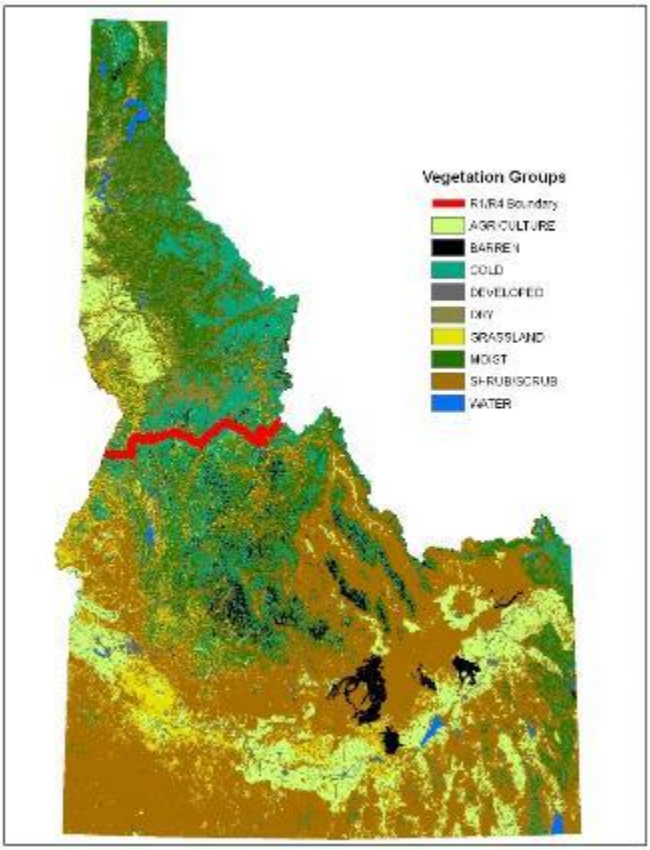
Idaho's Forest Resources

Idaho has over 21 million acres of forest land, from the Canadian border in the north, to the Great Basin in the south. Elevations range from less than 1,000 feet along the Clearwater River valley to over 12,000 feet in the Lost River Range of southeastern Idaho. The mixed conifer forests in the Panhandle area can be moist forest types that include tree species found on the Pacific Coast such as western hemlock, Pacific yew, and western redcedar. Southern Idaho forests are generally drier, and ponderosa pine and Douglas-fir are most common. Lodgepole pine, Engelmann spruce, whitebark pine and subalpine fir occur at higher elevations throughout the state.

Idaho Vegetation Types

Douglas-fir and spruce/fir forest types make up the largest proportions of forests in Idaho, followed by lodgepole pine, ponderosa pine, hemlock/redcedar, other softwoods, pinyon/juniper, western larch, western white pine, and hardwoods.



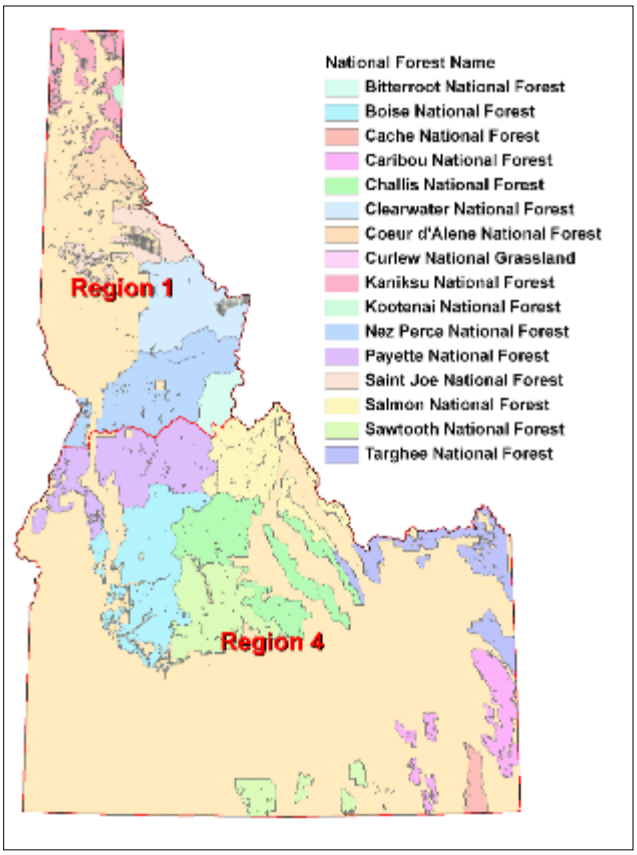


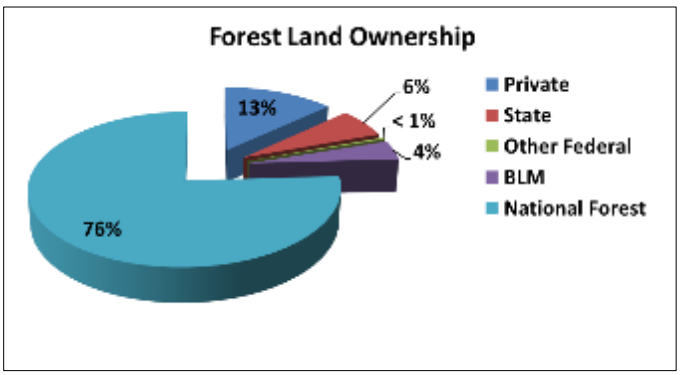
The Importance of Idaho's Forests

Idaho's forests are important for many reasons. Forests are home to wildlife, provide watersheds for drinking water, and protect streams that are habitat for many species of fish, including salmon, steelhead and bull trout. Forests are also important for recreation, and Idaho has over 4.5 million acres of wilderness. Idaho's forests are renewable, and are an important resource for the forest products industry. Maintaining healthy forests is crucial to protect all the things that they provide.

Forest Ownership in Idaho

The majority of forest land in Idaho is owned by the Federal government (> 16 million acres), and of this, most is administered by the U.S. Forest Service. The state of Idaho owns just under 1.3 million acres, and private landowners own an additional 2.8 million acres. The various owners often have different management objectives. Idaho's National Forests lie within two administrative regions. The Northern Region (Region 1) is located north of the Salmon River and is comprised of the Idaho Panhandle, Nez Perce-Clearwater and Bitterroot National Forests. The Intermountain Region (Region 4) is in southern Idaho and includes the Boise, Payette, Sawtooth, Salmon-Challis, and Caribou-Targhee National Forests.

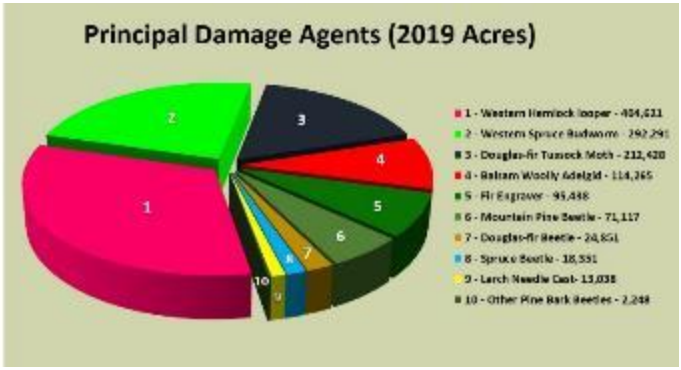




Idaho's Forest Industry

Idaho has a productive forest industry, with 2019 estimated revenues of wood and paper products totaling over $2 billion. An estimated 16,412 people were directly employed in the forest products industry in 2019. The total harvest was estimated at 1.3 billion board feet of timber. An estimated 69% of this total came from private lands. State land provided 17% and federal lands provided 14% of the total. Most of Idaho's commercial forestland and larger production facilities are located north of the Salmon River. Forest products from Idaho's forests are sold throughout the world. Link to University of Idaho Policy Analysis Group.

Aerial Detection Survey Results

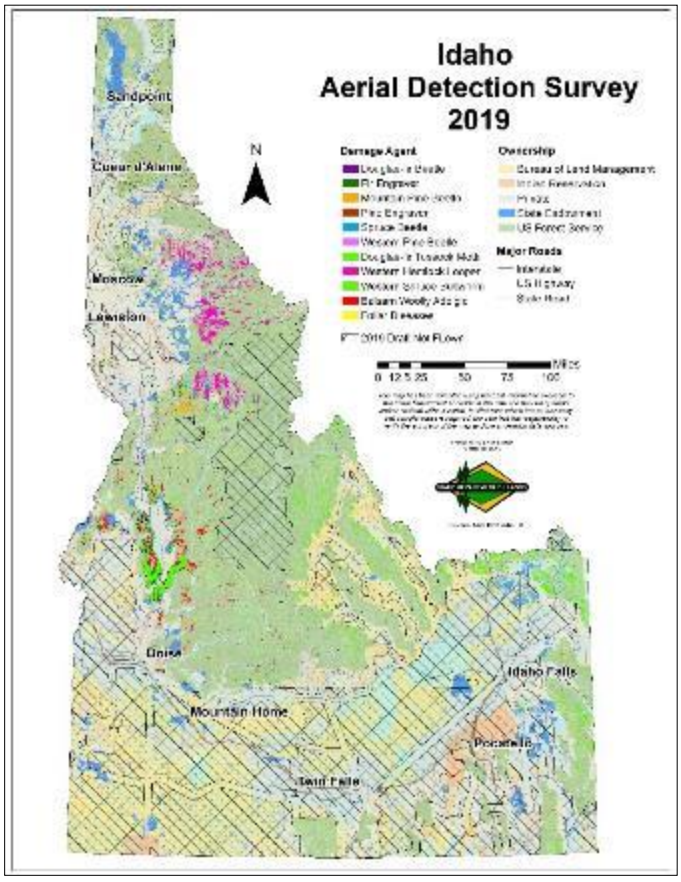

Principal Damage Agents (2019 Acres)
1 - Western Hemlock looper - 404,631
2 - Western Spruce Budworm - 292,291
3 - Douglas-fir Tussock Moth - 212,420
4 - Balsam Woolly Adelgid - 114,265
5 - Fir Engraver - 95,448
6 - Mountain Pine Beetle - 71,117
7 - Douglas-fir Beetle - 24,851
8 - Spruce Beetle - 18,551
9 - Larch Needle Cast- 13,038
10 - Other Pine Bark Beetles - 2,248

Bark Beetles

In 2019, fir engraver mortality was observed on over 95,000 acres compared to 101,000 acres in 2018. Approximately 71,000 acres were impacted by mountain pine beetle compared to 65,000 acres in 2018. Most of the mortality was in lodgepole pine, but approximately 2500 acres of other pine species (limber, ponderosa, whitebark, and western white) were affected in 2019. Douglas-fir beetle caused mortality on approximately 25,000 acres in 2019 compared to approximately 28,000 acres in 2018. Western pine beetle mortality decreased to approximately 1000 affected acres in 2019 compared to 2,900 in 2018. Pine engraver mortality decreased from 3,300 affected acres in 2018 to approximately 1,300 in 2019. The recent droughty conditions contributed to bark beetle mortality.

Defoliators

Western spruce budworm is a major defoliator of Douglas-fir and grand fir in Idaho, especially in the south. Approximately 292,000 acres were affected in 2019, compared to over 273,000 acres in 2018. Most of the defoliation is in southern Idaho. Western hemlock looper, a native defoliator, damaged over 400,000 acres on the Nez Perce-Clearwater and St. Joe National Forests. Defoliation occurred in 2018, but was not recorded in the aerial survey due to early flight timing. The Douglas-fir tussock moth outbreak that occurred in southern Idaho in 2018 increased from 107,000 affected acres to 212,000 acres in 2019. The outbreak occurred in and adjacent to the Boise and Payette National Forests. The populations appeared to largely collapse in 2019. No defoliation was observed in northern Idaho in 2019, though ground surveys indicate that populations are increasing. Visible defoliation is expected in 2021.



Other Agents

Approximately 13,000 acres were affected by larch needle cast in 2019, compared to 28,000 acres in 2018. The decrease is attributed to favorable conditions in the spring during shoot elongation. Mortality of subalpine fir, attributed to balsam woolly adelgid, western balsam bark beetle and possible root disease increased in 2019 to approximately 114,000 acres, up from 103,000 acres recorded in 2018. Link to IDL Insect and Disease page with ADS map

Notes on Aerial Detection Surveys

A total of 27.8 million acres were surveyed in Idaho in 2019, compared to 27.9 million acres in 2018. It is important to remember that trees attacked by bark beetles do not usually change color until the following year, so mortality observed in 2019 actually represents trees that were attacked in 2018.

Idaho's forests are also significantly impacted by diseases, but not all diseases are easily detected from the air. With the exception of foliar diseases, **most *forest diseases are not well represented by aerial detection surveys.*** Root diseases are very common in northern Idaho, affecting over 8 million acres, with most mortality occurring in Douglas-fir, grand fir, and subalpine fir in northern Idaho. Dwarf mistletoes infect over 2.5 million acres of forest statewide. These parasites are especially damaging on western larch, Douglas-fir, lodgepole pine and ponderosa pine. White pine blister rust is widespread throughout the range of western white, whitebark and limber pines, affecting millions of trees, though an acreage estimate would be difficult to determine.

Key Forest Insect Issues in Idaho

Bark beetles continue to kill susceptible trees in Idaho, though the totals have decreased markedly over the last several years. The decrease is most likely due to host depletion. In 2019, mountain pine beetle killed trees on over 71,000 acres in Idaho, compared to a peak of over 1.9 million acres in 2010. **Spruce beetle** is another bark beetle that is capable of large scale mortality in susceptible spruce stands. Approximately 18,400 affected acres were identified in the Nez Perce National Forest in north central Idaho in 2018. There were approximately 6,800, 10,000 and 3,300 affected acres in the same area in 2018, 2017 and 2016 respectively. Link to IDL publication

The Douglas-fir tussock moth is a defoliating insect that periodically infests Douglas-fir and true firs in Idaho. Outbreaks occur approximately once per decade, and the most damaging infestations have occurred in northern Idaho. Historically, outbreaks have lasted 1-4 years, and then natural controls bring the populations down to undetectable levels. Considerable defoliation (>200,000 acres) was observed in and adjacent to the Boise and Payette National Forests in 2019, compared to over 100,000 acres in 2018. The Douglas-fir tussock moth will probably begin to defoliate forested areas in northern Idaho within the next three years. Link to USFS brochure; Link to IDL 2019 Douglas-fir Tussock Moth Report

Gypsy moth survey. Over 2,700 pheromone traps were deployed and collected in Idaho in 2019, and no European gypsy moths were captured. A delimit survey was concluded in Bannock County in 2018. Link to IDL Insect and Disease page with gypsy moth information

Western spruce budworm infested acres increased in 2019 to approximately 292,000 acres, compared to 273,000 acres in 2018 and 258,000 acres in 2017. In 2011 the total was over 1.8 million acres. The reason for the decrease in unclear. Link to USFS publication

Key Forest Disease Issues in Idaho

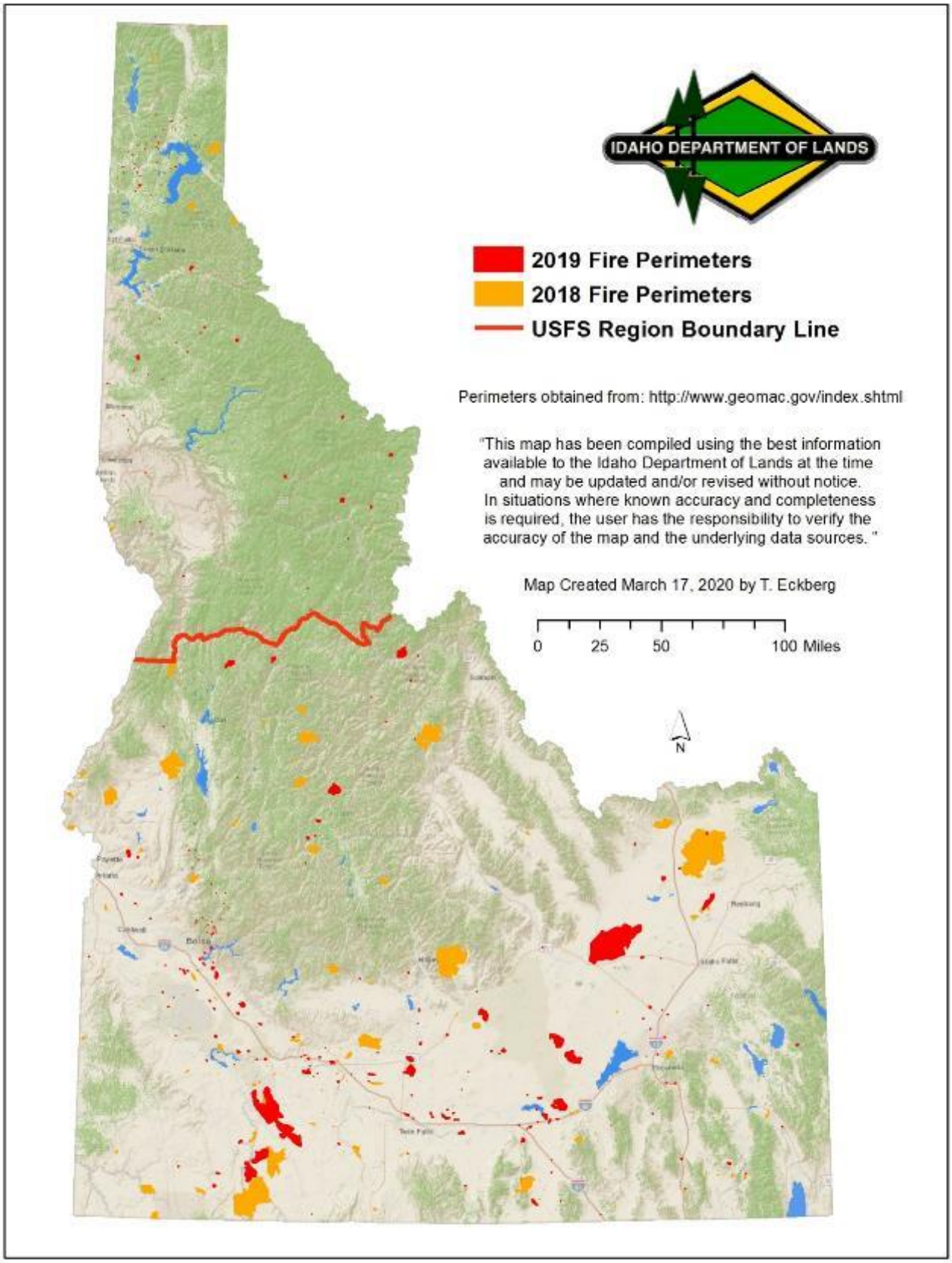
Root diseases north of the Salmon River kill millions of trees every year. Douglas-fir and grand fir are particularly susceptible. Root diseases are more prevalent than aerial detection survey data indicate, and are very common in northern Idaho, though they occur statewide. Root diseases can be managed through silviculture by encouraging tolerant species. While all conifer species are susceptible to root diseases (especially at a young age), pines, western larch and western redcedar are more tolerant, especially after the trees reach 20-25 years of age. Link to additional information

Dwarf mistletoes infect many species of conifers in Idaho. Most damage is on western larch, Douglas-fir, ponderosa and lodgepole pines. These parasitic plants reduce growth and over time can kill trees. Dwarf mistletoes are fairly host specific, and can be managed through silviculture by removing heavily infected trees and by converting stands to nonhosts. Link to USFS publication

White pine blister rust is an introduced disease that kills 5-needled pines (western white, whitebark and limber) throughout western North America. Western white pine (WWP) was the dominant tree species in much of northern Idaho. Due to rust, fire suppression and past management practices, western white pine in now a minor component of many of these same forests. Idaho's forest type that was dominated by western white pine is now reduced to 5% of its historic levels. The Idaho Department of Lands aggressively plants rust resistant WWP in stands where it was historically present. Western white pine is fast growing, drought tolerant, and is not highly susceptible to root diseases. *Photo (R) by J. Schwandt* Link to USFS publication

Foliar Diseases can infect many species of conifers in Idaho, but damage is most noticeable on western larch and lodgepole pine. While the appearance can be dramatic, the effect on trees is usually minor. Cool, wet spring weather during needle development is favorable for disease development. Approximately 13,000 acres of foliar diseases were mapped in 2019, compared to approximately 28,000 and 49,000 acres in 2018 and 2017 respectively. Link to IDL Forester Forum

2019 Fire Season


IDAHO DEPARTMENT OF LANDS
2019 Fire Perimeters
2018 Fire Perimeters
USFS Region Boundary Line
Perimeters obtained from: http://www.geomac.gov/index.shtml
"This map has been compiled using the best information available to the Idaho Department of Lands at the time and may be updated and/or revised without notice. In situations where known accuracy and completeness is required, the user has the responsibility to verify the accuracy of the map and the underlying data sources."
Map Created March 17, 2020 by T. Eckberg
0 25 50 100 Miles
N

Fire Activity in Idaho, 2019

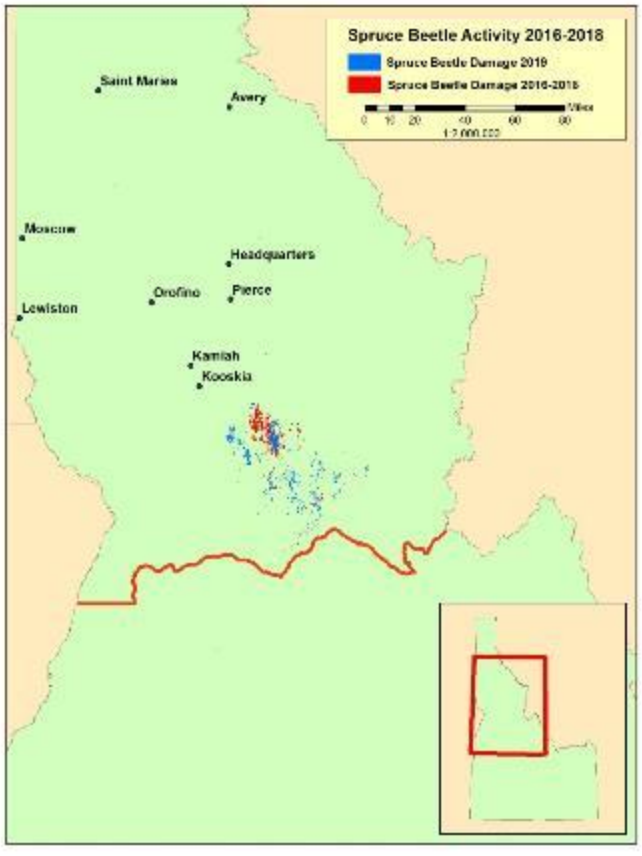
The total acreage burned in Idaho in 2019 was approximately 284,000 acres. A large percentage of these acres was in southern Idaho on rangeland.

Link to NIFC 2019 Fire Statistics

Spruce Beetle 2016-2019

Spruce beetle (*Dendroctonus rufipennis*) is a native bark beetle that can have irruptive populations capable of landscape level mortality. Severe outbreaks have occurred in Utah and Alaska in the 1990s, and a current outbreak in Colorado impacted over 200,000 acres in 2017. This species attacks Engelmann spruce in Idaho, and there have been large scale outbreaks in the past. Until recently, spruce beetle has been at low population levels in Idaho, but an outbreak was identified in the Nez Perce National Forest in 2016, and the damage continued in 2018 with 6,800 affected acres. Outbreaks often start with wind events that uproot large diameter spruce. The beetles infest these down trees, and populations build over time and then attack standing trees. Outbreaks generally subside when suitable hosts (large diameter spruce) are depleted.
Link to USFS Publication

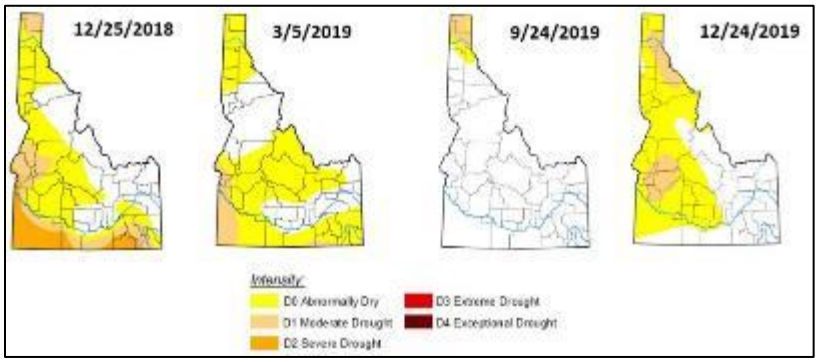
Photograph of 2018 spruce beetle mortality on the Nez Perce National Forest, Idaho

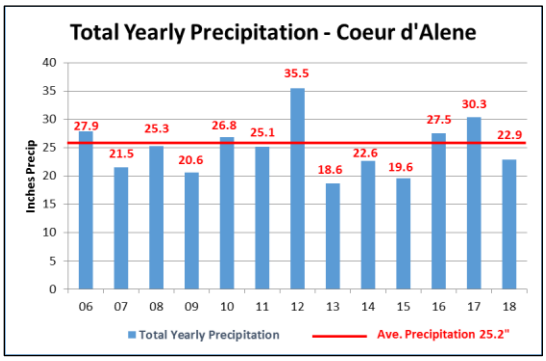


Map of 2016-2019 spruce beetle mortality in the Nez Perce National Forest, Idaho

Drought in Idaho

Northern Idaho had been receiving abnormally low precipitation since 2013, especially during the growing season. By 2015 many areas were experiencing severe or extreme drought. In addition to increased fire activity during drought, trees are stressed and often become more susceptible to bark beetle attack. Certain bark beetle species such as pine engraver (*Ips pini*), western pine beetle (*Dendroctonus brevicomis*) and fir engraver (*Scolytus ventralis*) tend to cause more problems for land managers during droughts. *Scolytus monticolae*, a secondary species that does not normally cause serious problems, was killing Douglas-fir of all ages. This species usually attacks small, weakened trees or branches of trees. Mortality from *S. monticolae* was common during the fall of 2015 through spring of 2016, but became less visible as normal moisture returned in late 2016. Idaho Department of Lands personnel received an uptick of calls about secondary beetles in 2018. Overall, 2018 was a below average year for precipitation, with very little moisture falling during July-September. Wet weather during the fall decreased the level of drought, though parts of Idaho remained in severe drought. Winter snows brought most of the state out of drought by March 2019. [Link to NOAA Drought Monitor]





Bark Beetles and Drought

Fir engraver-killed trees near Coeur d'Alene.

Ponderosa pine killed by pine engraver in Post Falls.

Douglas-fir killed by *Scolytus monticolae* in Hayden.

Douglas-fir Tussock Moth in Idaho

Douglas-fir tussock moth (DFTM) is a native defoliating insect found throughout the west. It feeds on grand fir, Douglas-fir and occasionally other conifers. Large scale outbreaks have occurred in Idaho regularly, happening about once per decade. An outbreak started in the Smiths Ferry area (Valley and Boise Counties) and simultaneously near Craters of the Moon National Monument (Butte County) in southern Idaho. Limited defoliation started in 2017 in both areas and increased markedly to over 100,000 acres in 2018. Defoliation was widespread in 2018 on grand fir, Douglas-fir and subalpine fir with most activity in Boise and Valley Counties. The Butte County outbreak was limited to approximately 100 acres on north facing slopes in older Douglas-fir. Defoliation was very heavy in the main outbreak area near Smiths Ferry, with many trees defoliated over 90%. Egg mass surveys in the fall of 2018 indicated high population levels and that there would be defoliation in 2019. Defoliation increased in 2019 to over 200,000 acres, though damage was not as severe as 2018. Heavy winter snowpack, moderate temperatures and normal precipitation in 2019 resulted in decreased damage.

Trees can tolerate light defoliation, but once defoliation exceeds 50%, some damage such as top-kill can occur. When defoliation is greater than 90%, the trees usually die. Widespread mortality of grand fir and Douglas-fir occurred on state, private and federal lands in Valley and Boise Counties. Bark beetles such as Douglas-fir beetle and fir engraver can attack heavily damaged trees. Wood borers also infest damaged trees which can decrease the salvage value of logs.

Tussock moth outbreaks usually collapse after three years of defoliation due to natural enemies such as parasitic flies and wasps, and also due to a viral disease that is specific to this insect. Ground surveys through the 2019 season indicated that parasites and viral disease were widespread throughout the outbreak area and that the population would collapse. a survey in the fall looking for the overwintering egg masses is the best indicator of defoliation the next year. Very few egg masses were found in the main outbreak area, though two locations west of Council had high numbers. Limited defoliation is possible in this localized area.

Trapping surveys in northern Idaho suggest that populations are increasing and defoliation is likely in 2021. The last outbreak in northern Idaho occurred from 2010 to 2012 with defoliation covering over 100,000 acres at its peak. Widespread mortality did not occur then, though there were limited pockets of mortality throughout the outbreak area.

Drone photo of Douglas-fir and grand fir damaged by Douglas-fir tussock moth in Valley County Idaho taken on June 26, 2019. These trees were killed from one season of defoliation, and were salvaged starting in October, 2019.

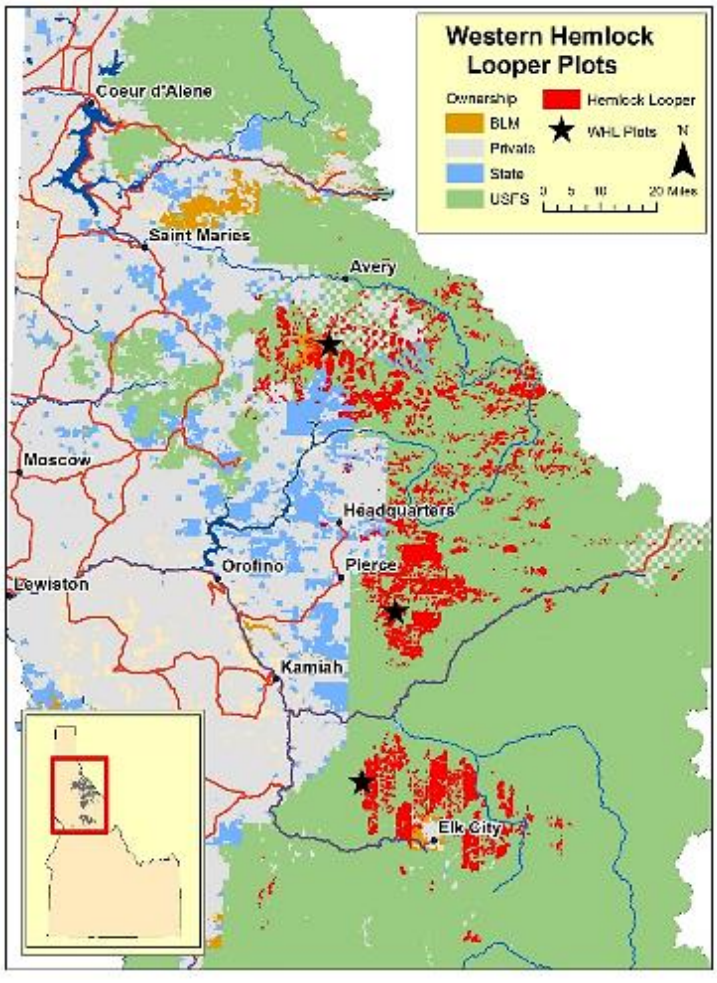
Western Hemlock Looper

Western hemlock looper (WHL) is a native defoliating insect in North America. WHLs have a broad host range of conifers and even some broadleaf species, and host preferences can vary by region. WHL larvae are the damaging life stage and resemble small inch worms. Outbreaks of WHL occur periodically and typically last for a few years before populations crash due to parasites, predators, and disease. In northern Idaho, WHL outbreaks have been recorded in the 1970's, 2000-2003, and 2010-2011.

In the fall of 2018, large numbers of WHL adult moths were observed in Idaho, primarily near the Nez-Perce Clearwater National Forest. It is likely that some 2018 defoliation occurred but was miscoded in ADS surveys as western spruce budworm. Defoliation by these two insects can look similar from the air, and areas that were coded as western spruce budworm in 2018 were coded as WHL in 2019. Ground checks in 2019 confirmed that the damage agent was indeed WHL.

In 2019, just over 400,000 acres with WHL-caused defoliation were mapped in Idaho in Clearwater, Shoshone, and Idaho counties (from approximately Elk City to Avery), as well as some additional areas in western Montana. Defoliation severity appeared much worse from the air, and ground observations indicate that ADS records over-estimated defoliation severity in most polygons. However, ADS surveys did successfully capture relative damage severity across the landscape. From the air, subalpine fir appeared to be the most severely damaged overstory species overall.

IDL and USFS Forest Health Protection (FHP) entomologists installed ground monitoring plots in WHL-affected stands at three sites across the outbreak area. Most trees in the monitoring plots experienced only light to moderate defoliation, but some trees were defoliated 90 – 100%. Plot data show that subalpine fir and western red cedar were, on average, the most heavily defoliated host tree species in 2019, followed by grand fir, Douglas-fir, and Engelmann spruce. In general, damage was highest on small trees, presumably because feeding WHL larvae can rain down on these trees from the overstory. Trees that were severely defoliated in 2019 may not recover in 2020, and trees that were moderately damaged may be more susceptible to other damage agents in the coming years. For more information, see the forthcoming report to be published by Malesky et al., 2020 through USFS Forest Health Protection.



Western hemlock looper defoliation projections vary for 2020. Historic outbreaks in this area only lasted approximately two years, and early indicators in the 2018-2019 outbreak suggest populations are expected to decline in 2020. Lab tests of collected WHLs indicate that disease and parasites are already acting to reduce WHL populations. However, some tree defoliation is likely to continue during summer 2020.

Left: Map of areas with western hemlock looper-caused defoliation (red) and areas with monitoring plots installed (stars).

Above: Defoliation by western hemlock looper as seen in aerial surveys. Photo: Scott Sontag

For More Information

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USDA Forest Service
Coeur d'Alene Field Office
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